

## CHAPTER 4E. PEDESTRIAN CONTROL FEATURES

### Section 4E.01 Pedestrian Signal Heads

#### Support:

Pedestrian signal heads provide special types of traffic signal indications exclusively intended for controlling pedestrian traffic. These signal indications consist of the illuminated symbols of a WALKING PERSON (symbolizing WALK) and an UPRAISED HAND (symbolizing DONT WALK).

#### Guidance:

Engineering judgment should determine the need for separate pedestrian signal heads (see Section 4D.03) and accessible pedestrian signals (see Section 4E.06).

### Section 4E.02 Meaning of Pedestrian Signal Head Indications

#### Standard:

Pedestrian signal head indications shall have the following meanings:

- A. A steady WALKING PERSON (symbolizing WALK) signal indication means that a pedestrian facing the signal indication is permitted to start to cross the roadway in the direction of the signal indication, possibly in conflict with turning vehicles. The pedestrian shall yield the right-of-way to vehicles lawfully within the intersection at the time that the WALKING PERSON (symbolizing WALK) signal indication is first shown.
- B. A flashing UPRAISED HAND (symbolizing DONT WALK) signal indication means that a pedestrian shall not start to cross the roadway in the direction of the signal indication, but that any pedestrian who has already started to cross on a steady WALKING PERSON (symbolizing WALK) signal indication shall proceed out of the traveled way.
- C. A steady UPRAISED HAND (symbolizing DONT WALK) signal indication means that a pedestrian shall not enter the roadway in the direction of the signal indication.
- D. A flashing WALKING PERSON (symbolizing WALK) signal indication has no meaning and shall not be used.
- E. Countdown Pedestrian indications display the number of second remaining before the Steady UPRAISED HAND is displayed.



### Section 4E.03 Application of Pedestrian Signal Heads

#### Standard:

Pedestrian signal heads shall be used in conjunction with vehicular traffic control signals under any of the following conditions:

- A. If a traffic control signal is justified by an engineering study and meets either Warrant 4, Pedestrian Volume or Warrant 5, School Crossing (see Chapter 4C);
- B. If an exclusive signal phase is provided or made available for pedestrian movements in one or more directions, with all conflicting vehicular movements being stopped; or
- C. At an established school crossing at any signalized location.
- D. Where engineering judgment determines that multiphase signal indications (as with split-phase timing) would tend to confuse or cause conflicts with pedestrians using a crosswalk guided only by vehicular signal indications.

#### Guidance:

Pedestrian signal heads should be used under any of the following conditions:

- A. If it is necessary to assist pedestrians in making a reasonably safe crossing or if engineering judgment determines that pedestrian signal heads are justified to minimize vehicle-pedestrian conflicts;
- B. If pedestrians are permitted to cross a portion of a street, such as to or from a median of sufficient width for pedestrians to wait, during a particular interval but are not permitted to cross the remainder of the street during any part of the same interval; and/or
- C. If no vehicular signal indications are visible to pedestrians, or if the vehicular signal indications that are visible to pedestrians starting or continuing a crossing provide insufficient guidance for them to decide when it is reasonably safe to cross, such as on one-way streets, at T-intersections, or at multiphase signal operations.

## Section 4E.04 Size, Design, and Illumination of Pedestrian Signal Head Indications

### Standard:

All new pedestrian signal head indications shall be displayed within a rectangular background and shall consist of symbolized messages (see Figure 4E-1), except that existing pedestrian signal head indications with lettered or outline style symbol messages may be retained for the remainder of their useful service life. The symbol designs that are set forth in the “Standard Highway Signs” book shall be used. Each pedestrian signal head indication shall be independently illuminated and emit a single color.

The UPRaised HAND (symbolizing DONT WALK) signal section shall be mounted directly above or integral with the WALKING PERSON (symbolizing WALK) signal section.

The WALKING PERSON (symbolizing WALK) signal indication shall be white, conforming to the publication entitled “Pedestrian Traffic Control Signal Indications” (seeSection1A.11), with all except the symbol obscured by an opaque material.

The UPRaised HAND (symbolizing DONT WALK) signal indication shall be Portland orange, conforming to the publication entitled “Pedestrian Traffic Control Signal Indications” (see Section1A.11), with all except the symbol obscured by an opaque material.



**Countdown Pedestrian indications shall have numbers that are Portland orange in color.**

When not illuminated, the WALKING PERSON (symbolizing WALK) and UPRaised HAND (symbolizing DONT WALK) symbols shall not be readily visible to pedestrians at the far end of the crosswalk that the pedestrian signal head indications control.

For pedestrian signal head indications, the symbols shall be at least 150mm (6 in) high.



**Along SHA owned, operated, and maintained roadways, for pedestrian signal head indications, the symbols shall be at least 225 mm (9 in) high. Countdown numbers shall be 225 mm (9 in) high.**

The light source of a flashing UPRaised HAND (symbolizing DONT WALK) signal indication shall be flashed continuously at a rate of not less than 50 nor more than 60 times per minute. The illuminated period of each flash shall be not less than half and not more than two-thirds of the total flash cycle.

### Guidance:

Pedestrian signal head indications should be conspicuous and recognizable to pedestrians at all distances from the beginning of the controlled crosswalk to a point 3 m (10 ft) from the end of the controlled crosswalk during both day and night.

For crosswalks where the pedestrian enters the crosswalk more than 30 m (100 ft) from the pedestrian signal head indications, the symbols should be at least 225 mm (9 in) high.

### Option:

An animated eyes symbol may be added to a pedestrian signal head in order to prompt pedestrians to look for vehicles in the intersection during the time that the WALK signal indication is displayed.

### Standard:

If used, the animated eyes symbol shall consist of an outline of a pair of white steadily-illuminated eyes with white eyeballs that scan from side to side at a rate of approximately once per second. The animated eyes symbol shall be at least 300 mm (12 in) wide with each eye having a width of at least 125 mm (5 in) and a height of at least 62 mm (2.5 in). The animated eyes symbol shall be illuminated at the start of the walk interval and shall terminate at the end of the walk interval.

## Section 4E.05 Location and Height of Pedestrian Signal Heads

### Standard:

Pedestrian signal heads shall be mounted with the bottom of the signal housing including brackets not less than 2.1 m (7 ft) nor more than 3 m (10 ft) above sidewalk level, and shall be positioned and adjusted to provide maximum visibility at the beginning of the controlled crosswalk.

If pedestrian signal heads are mounted on the same support as vehicular signal heads, there shall be a physical separation between them.

## Section 4E.06 Accessible Pedestrian Signals

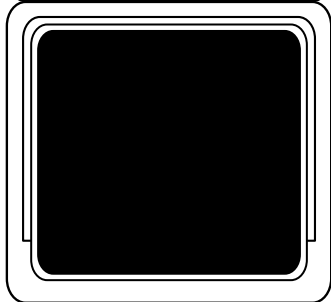
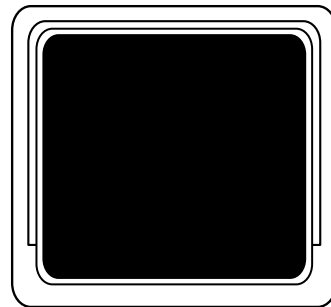
### Support:

The primary technique that pedestrians who have visual disabilities use to cross streets at signalized locations is to initiate their crossing when they hear the traffic in front of them stop and the traffic along side them begin to

**Figure 4E-1. Typical Pedestrian Signal Indications**



**One Section**



**Two Section**



**Countdowns**

move, corresponding to the onset of the green interval. This technique is effective at many signalized locations. The existing environment is often sufficient to provide the information that pedestrians who have visual disabilities need to operate reasonably safely at a signalized location. Therefore, many signalized locations will not require any accessible pedestrian signals.

**Guidance:**

If a particular signalized location presents difficulties for pedestrians who have visual disabilities to cross reasonably safely and effectively, an engineering study should be conducted that considers the safety and effectiveness for pedestrians in general, as well as the information needs of pedestrians with visual disabilities.

**Support:**

The factors that might make crossing at a signalized location difficult for pedestrians who have visual disabilities include: increasingly quiet cars, right turn on red (which masks the beginning of the through phase), continuous right-turn movements, complex signal operations, traffic circles, and wide streets. Further, low traffic volumes might make it difficult for pedestrians who have visual disabilities to discern signal phase changes.

Local organizations, providing support services to pedestrians who have visual and/or hearing disabilities, can often act as important advisors to the traffic engineer when consideration is being given to the installation of devices to assist such pedestrians. Additionally, orientation and mobility specialists or similar staff also might be able to provide a wide range of advice. The U.S. Access Board's Document A-37, "Accessible Pedestrian Signals," provides various techniques for making pedestrian signal information available to persons with visual disabilities (see Page i for the address for the U.S. Access Board).

Accessible pedestrian signals provide information in nonvisual format (such as audible tones, verbal messages, and/or vibrating surfaces).

Information regarding detectors for accessible pedestrian signals is found in Section 4E.09.

**Standard:**

**When used, accessible pedestrian signals shall be used in combination with pedestrian signal timing. The information provided by an accessible pedestrian signal shall clearly indicate which pedestrian crossing is served by each device.**

**Under stop-and-go operation, accessible pedestrian signals shall not be limited in operation by the time of day or day of week.**

**Guidance:**

The installation of accessible pedestrian signals at signalized locations should be based on an engineering study, which should consider the following factors:

- A. Potential demand for accessible pedestrian signals;
- B. A request for accessible pedestrian signals;
- C. Traffic volumes during times when pedestrians might be present, including periods of low traffic volumes or high turn-on-red volumes;
- D. The complexity of traffic signal phasing; and
- E. The complexity of intersection geometry.

**Standard:**

**At signalized intersections along the State Highway System, all pedestrian WALK - DONT WALK signals shall be provided with accessible pedestrian signals.**



**Support:**

Technology that provides different sounds for each nonconcurrent signal phase has frequently been found to provide ambiguous information.

**Standard:**

**When choosing audible tones, possible extraneous sources of sounds (such as wind, rain, vehicle back-up warnings, or birds) shall be considered in order to eliminate potential confusion to pedestrians who have visual disabilities.**

**Guidance:**

Audible pedestrian tones should be carefully selected to avoid misleading pedestrians who have visual disabilities when the following conditions exist:

- A. Where there is an island that allows unsignalized right turns across a crosswalk between the island and the sidewalk.

- B. Where multileg approaches or complex signal phasing require more than two pedestrian phases, such that it might be unclear which crosswalk is served by each audible tone.
- C. At intersections where a diagonal pedestrian crossing is allowed, or where one street receives a WALKING PERSON (symbolizing WALK) signal indication simultaneously with another street.

**Standard:**

**When accessible pedestrian signals have an audible tone(s), they shall have a tone for the walk interval. The audible tone(s) shall be audible from the beginning of the associated crosswalk. If the tone for the walk interval is similar to the pushbutton locator tone, the walk interval tone shall have a faster repetition rate than the associated pushbutton locator tone.**

**Support:**

A pushbutton locator tone is a repeating sound that informs approaching pedestrians that they are required to push a button to actuate pedestrian timing, and that enables visually impaired pedestrians to locate the pushbutton (see Section 4E.09).

**Guidance:**

The accessible walk signal tone should be no louder than the locator tone, except when there is optional activation to provide a louder signal tone for a single pedestrian phase.

Automatic volume adjustment in response to ambient traffic sound level should be provided up to a maximum volume of 89 dBA. Where automatic volume adjustment is used, tones should be no more than 5 dBA louder than ambient sound. The A-weighted sound pressure level should conform to the requirements of "ISO 1996-1:1982" and "ISO 1996-2:1987" (see Page i for the address for the International Organization for Standards).

**Standard:**

**When verbal messages are used to communicate the pedestrian interval, they shall provide a clear message that the walk interval is in effect, as well as to which crossing it applies.**

**The verbal message that is provided at regular intervals throughout the timing of the walk interval shall be the term "walk sign," which may be followed by the name of the street to be crossed.**

**A verbal message is not required at times when the walk interval is not timing, but, if provided:**

**A. It shall be the term "wait."**

**B. It need not be repeated for the entire time that the walk interval is not timing.**

**Option:**

Accessible pedestrian signals that provide verbal messages may provide similar messages in languages other than English, if needed, except for the terms "walk sign" and "wait."

**Support:**

A vibrotactile pedestrian device communicates information about pedestrian timing through a vibrating surface by touch.

**Standard:**

**Vibrotactile pedestrian devices, where used, shall indicate that the walk interval is in effect, and for which direction it applies, through the use of a vibrating directional arrow or some other means.**

**Guidance:**

When provided, vibrotactile pedestrian devices should be located next to, and on the same pole as, the pedestrian pushbutton, if any, and adjacent to the intended crosswalk.

**Section 4E.07 Countdown Pedestrian Signals****Option:**

A pedestrian interval countdown display may be added to a pedestrian signal head in order to inform pedestrians of the number of seconds remaining in the pedestrian change interval.

**Standard:**

**If used, countdown pedestrian signals shall consist of Portland orange numbers that are at least 225 mm (9 in) in height on a black opaque background. The countdown pedestrian signal shall be located immediately adjacent to the associated UPRAISED HAND (symbolizing DONT WALK) pedestrian signal head indication.**

**If used, the display of the number of remaining seconds shall begin only at the beginning of the pedestrian change interval. After the countdown displays zero, the display shall remain dark until the beginning of the next countdown.**

**If used, the countdown pedestrian signal shall display the number of seconds remaining until the termination of the pedestrian change interval. Countdown displays shall not be used during the walk interval nor during the yellow change interval of a concurrent vehicular phase.**

**All pedestrian signal indications at intersections along the state highway system shall be equipped with countdown pedestrian signals.**



Guidance:

If used with a pedestrian signal head that does not have a concurrent vehicular phase, the pedestrian change interval (flashing UPRAISED HAND) should be set to be approximately 4 seconds less than the required pedestrian crossing time (see Section 4E.10) and an additional clearance interval (during which steady UPRAISED HAND is displayed) should be provided prior to the start of the conflicting vehicular phase. In this case, the countdown display of the number of remaining seconds should be displayed only during the display of the flashing UPRAISED HAND, should display zero at the time when the flashing UPRAISED HAND changes to steady UPRAISED HAND, and should be dark during the additional clearance interval prior to the conflicting vehicular phase.

For crosswalks where the pedestrian enters the crosswalk more than 30 m (100 ft) from the countdown pedestrian signal display, the numbers should be at least 225 mm (9 in) in height.

Because some technology includes the countdown pedestrian signal logic in a separate timing device that is independent of the timing in the traffic signal controller, care should be exercised by the engineer when timing changes are made to pedestrian change intervals.

If the pedestrian change interval is interrupted or shortened as a part of a transition into a preemption sequence (see Section 4E.10), the countdown pedestrian signal display should be discontinued and go dark immediately upon activation of the preemption transition.

## **Section 4E.08 Pedestrian Detectors**

Guidance:

When pedestrian actuation is used, pedestrian pushbutton detectors should be capable of easy activation and conveniently located near each end of the crosswalks.

**Standard:**

**Signs (see Section 2B.44) shall be mounted adjacent to or integral with pedestrian pushbutton detectors, explaining their purpose and use.**

Option:

At certain locations, a sign in a more visible location may be used to call attention to the pedestrian detector.

Guidance:

If two crosswalks, oriented in different directions, end at or near the same location, the positioning of pedestrian detectors and/or the legends on the pedestrian detector signs should clearly indicate which crosswalk signal is actuated by each pedestrian detector.

**Standard:**

**If the pedestrian clearance time is sufficient only to cross from the curb or shoulder to a median of sufficient width for pedestrians to wait and the signals are pedestrian actuated, an additional pedestrian detector shall be provided in the median.**

Guidance:

The use of additional pedestrian detectors on islands or medians where a pedestrian might become stranded should be considered.

A mounting height of approximately 1.1 m (3.5 ft) above the sidewalk should be used for pedestrian pushbutton detectors.

If used, special purpose pushbuttons (to be operated only by authorized persons) should include a housing capable of being locked to prevent access by the general public and do not need an instructional sign.

**Standard:**

**If used, a pilot light or other means of indication installed with a pedestrian pushbutton shall not be illuminated until actuation. Once it is actuated, it shall remain illuminated until the pedestrian's green or WALKING PERSON (symbolizing WALK) signal indication is displayed.**

**Option:**

At signalized locations with a demonstrated need and subject to equipment capabilities, pedestrians with special needs may be provided with additional crossing time by means of an extended pushbutton press.

**Section 4E.09 Accessible Pedestrian Signal Detectors****Standard:**

**An accessible pedestrian signal detector shall be defined as a device designated to assist the pedestrian who has visual or physical disabilities in activating the pedestrian phase.**

**At accessible pedestrian signal locations with pedestrian actuation, each pushbutton shall activate both the walk interval and the accessible pedestrian signals.**

**Option:**

Accessible pedestrian signal detectors may be pushbuttons or passive detection devices.

Pushbutton locator tones may be used with accessible pedestrian signals.

**Guidance:**

At accessible pedestrian signal locations, pushbuttons should clearly indicate which crosswalk signal is actuated by each pushbutton. Pushbuttons and tactile arrows should have high visual contrast as described in the “Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)” (see Section 1A.11). Tactile arrows should point in the same direction as the associated crosswalk. At corners of signalized locations with accessible pedestrian signals where two pedestrian pushbuttons are provided, the pushbuttons should be separated by a distance of at least 3 m (10 ft). This enables pedestrians who have visual disabilities to distinguish and locate the appropriate pushbutton.

Pushbuttons for accessible pedestrian signals should be located (see Figure 4E-2) as follows:

- A. Adjacent to a level all-weather surface to provide access from a wheelchair, and where there is an all-weather surface, wheelchair accessible route to the ramp;
- B. Within 1.5 m (5 ft) of the crosswalk extended;
- C. Within 3 m (10 ft) of the edge of the curb, shoulder, or pavement; and
- D. Parallel to the crosswalk to be used.

If the pedestrian clearance time is sufficient only to cross from the curb or shoulder to a median of sufficient width for pedestrians to wait and accessible pedestrian detectors are used, an additional accessible pedestrian detector should be provided in the median.

**Standard:**

**When used, pushbutton locator tones shall be easily locatable, shall have a duration of 0.15 seconds or less, and shall repeat at 1-second intervals.**

**Guidance:**

Pushbuttons should be audibly locatable. Pushbutton locator tones should be intensity responsive to ambient sound, and be audible 1.8 to 3.7 m (6 to 12 ft) from the pushbutton, or to the building line, whichever is less. Pushbutton locator tones should be no more than 5 dBA louder than ambient sound.

Pushbutton locator tones should be deactivated during flashing operation of the traffic control signal.

**Option:**

At locations with pretimed traffic control signals or nonactuated approaches, pedestrian pushbuttons may be used to activate the accessible pedestrian signals.

The audible tone(s) may be made louder (up to a maximum of 89 dBA) by holding down the pushbutton for a minimum of 3 seconds. The louder audible tone(s) may also alternate back and forth across the crosswalk, thus providing optimal directional information.

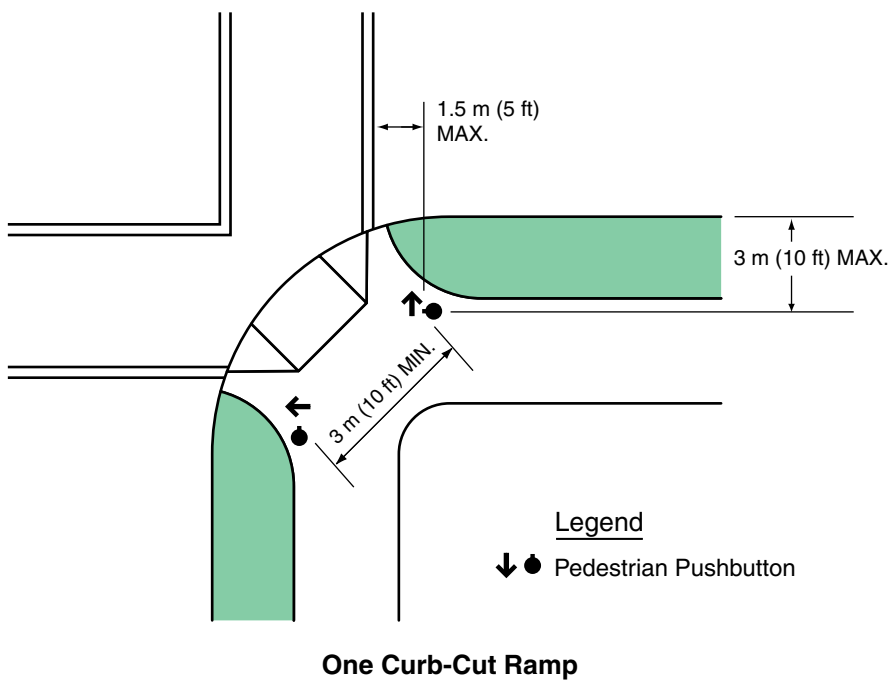
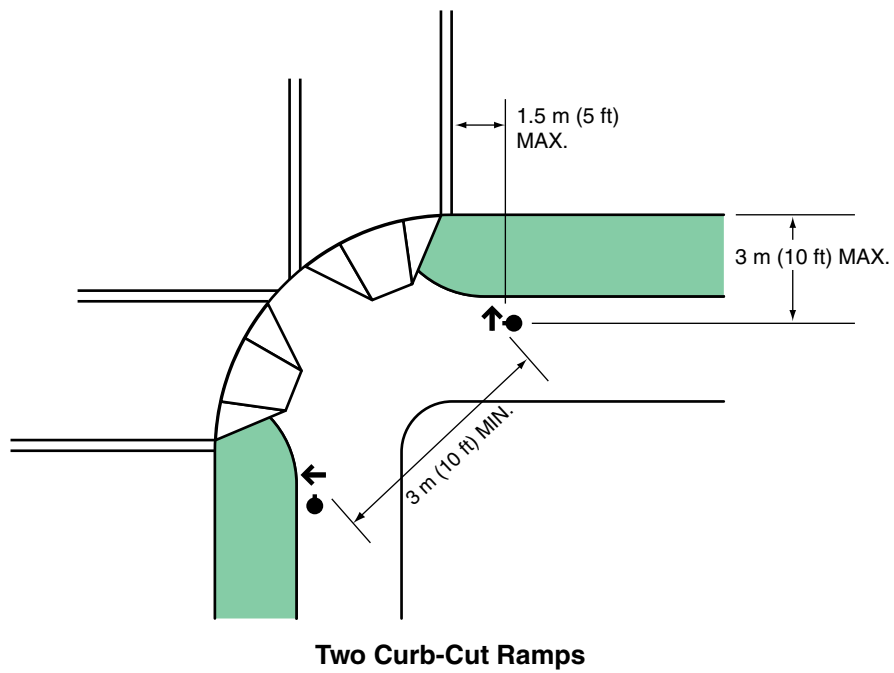
The name of the street to be crossed may also be provided in accessible format, such as Braille or raised print.

**Section 4E.10 Pedestrian Intervals and Signal Phases****Standard:**

**When pedestrian signal heads are used, a WALKING PERSON (symbolizing WALK) signal indication shall be displayed only when pedestrians are permitted to leave the curb or shoulder.**

**A pedestrian clearance time shall begin immediately following the WALKING PERSON (symbolizing WALK) signal indication. The first portion of the pedestrian clearance time shall consist of a pedestrian**

**Figure 4E-2. Recommended Pushbutton Locations for Accessible Pedestrian Signals**



**change interval during which a flashing UPRAISED HAND (symbolizing DONT WALK) signal indication shall be displayed. The remaining portions shall consist of the yellow change interval and any red clearance interval (prior to a conflicting green being displayed), during which a flashing or steady UPRAISED HAND (symbolizing DONT WALK) signal indication shall be displayed.**

**If countdown pedestrian signals are used, a steady UPRAISED HAND (symbolizing DONT WALK) signal indication shall be displayed during the yellow change interval and any red clearance interval (prior to a conflicting green being displayed) (see Section 4E.07).**

**At intersections equipped with pedestrian signal heads, the pedestrian signal indications shall be displayed except when the vehicular traffic control signal is being operated in the flashing mode. At those times, the pedestrian signal lenses shall not be illuminated.**

Guidance:

Except as noted in the Option, the walk interval should be at least 7 seconds in length so that pedestrians will have adequate opportunity to leave the curb or shoulder before the pedestrian clearance time begins.

Option:

If pedestrian volumes and characteristics do not require a 7-second walk interval, walk intervals as short as 4 seconds may be used.

Support:

The walk interval itself need not equal or exceed the pedestrian clearance time calculated for the roadway width, because many pedestrians will complete their crossing during the pedestrian clearance time.

Guidance:

The pedestrian clearance time should be sufficient to allow a pedestrian crossing in the crosswalk who left the curb or shoulder during the WALKING PERSON (symbolizing WALK) signal indication to travel at a walking speed of 1.2 m (4 ft) per second, to at least the far side of the traveled way or to a median of sufficient width for pedestrians to wait. Where pedestrians who walk slower than 1.2 m (4 ft) per second, or pedestrians who use wheelchairs, routinely use the crosswalk, a walking speed of less than 1.2 m (4 ft) per second should be considered in determining the pedestrian clearance time.

Option:

Passive pedestrian detection equipment, which can detect pedestrians who need more time to complete their crossing and can extend the length of the pedestrian clearance time for that particular cycle, may be used in order to avoid using a lower walking speed to determine the pedestrian clearance time.

Guidance:

Where the pedestrian clearance time is sufficient only for crossing from the curb or shoulder to a median of sufficient width for pedestrians to wait, additional measures should be considered, such as median-mounted pedestrian signals or additional signing.

Option:

The pedestrian clearance time may be entirely contained within the vehicular green interval, or may be entirely contained within the vehicular green and yellow change intervals.

On a street with a median of sufficient width for pedestrians to wait, a pedestrian clearance time that allows the pedestrian to cross only from the curb or shoulder to the median may be provided.

During the transition into preemption, the walk interval and the pedestrian change interval may be shortened or omitted as described in Section 4D.13.

